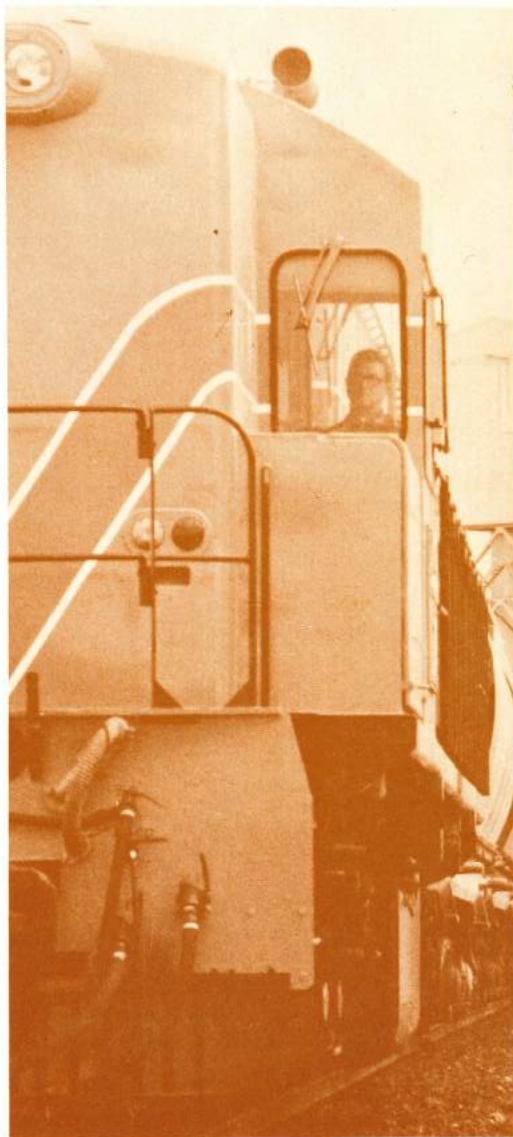
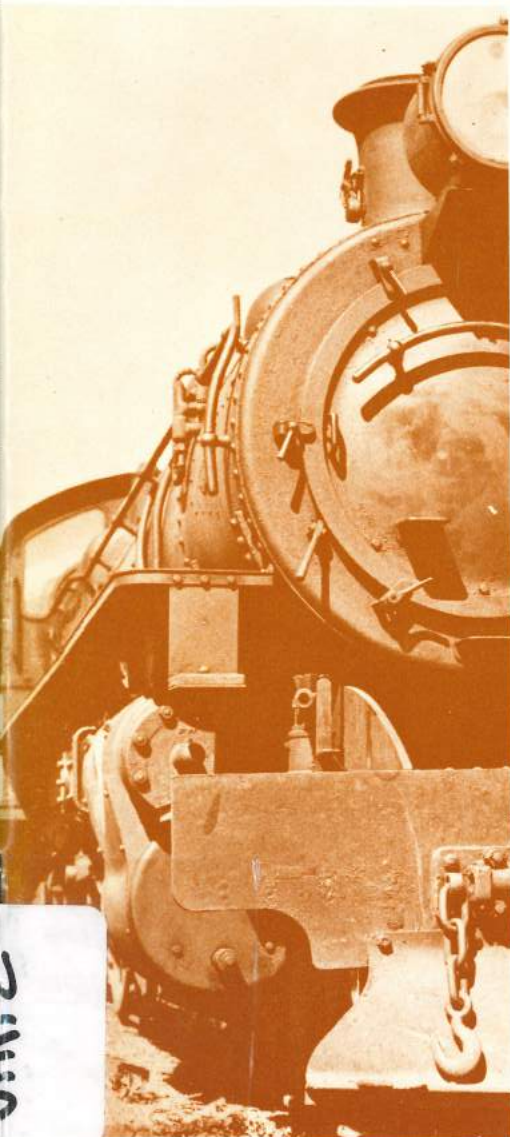




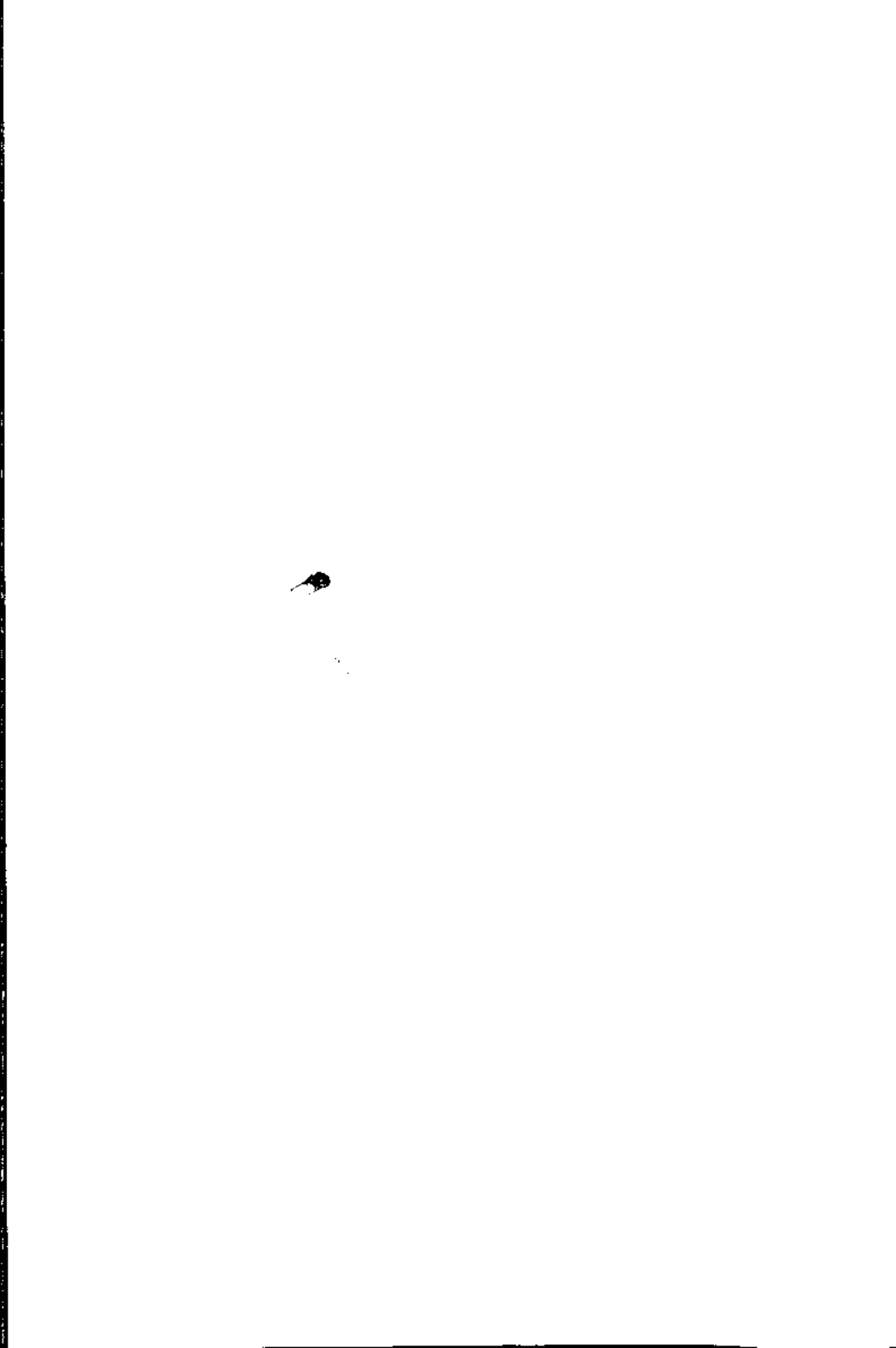
ST. THOMAS ACHINA'S SCHOOL
SALISBURY STREET
BEDFORD, 6052

Westrail

A concise history



An official Westrail publication





2019/126
WES
CATH 050

Westrail

A concise history

CONTENTS

First Railway	2
Eastern Railway Begins	3
Great Southern Railway	4
Midland Railway	4
Goldfields Railway	5
South West Railways	6
Closed Lines	7
Standard Gauge Project	8
Upgrading	11
West Kalgoorlie	
Esperance Standardisation	13
Passenger Trains	15
Freight Traffic	15
Locomotives	16
Suburban	17
Railway Road Services	18
Midland Workshops	20
Safeworking	21
General	22
Westrail Centre	24
Communications	25



Royal WA Historical Society
49 Broadway
Nedlands
Western Australia 6009

First published January 1975
Reprinted and revised January 1981



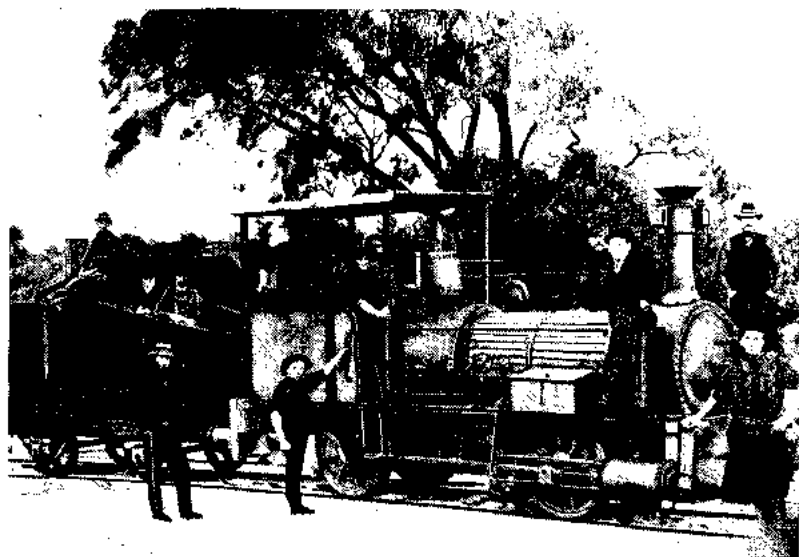
AL1140040487XB

Western Australia was the first portion of the Australian continent to be "discovered", but the last to be opened for settlement. The early Dutch navigators of the East India Company, blown off their course by the gales which swept periodically across the Indian Ocean, were the first known Europeans to touch the western shores of the continent of Australia. However, they did not go beyond naming some of the prominent features of the seaboard they had discovered. Today, dotted along our coast, the map honours a string of islands, headlands and inlets with names given by the Dutch at that time.

The first settlement in Western Australia was in 1826 when Major Lockyer brought a party of convicts and soldiers from Sydney to set up a military post at Albany on the southern coast. However, it was not until the following year that the whole territory — then known as "New Holland" — was taken possession in the name of the British Crown. The first Settlers from England arrived at Fremantle in June, 1829, and the colony of Western Australia was formed with Perth, 19 km inland, as the capital. By the end of 1834 the colony began to show signs of expansion and in 1868, when the population had increased to 15,000 the British Government granted Western Australia the right to have some say in its own Government.

FIRST RAILWAY

Western Australia's first railway — built in 1871 — was a privately owned timber line extending from Lockville, a few kilometres north of Busselton, into the adjacent forests. The first steam locomotive in Western



Western Australia's first locomotive, the "Ballarat" could haul 150 tons at 16 kmh. It costs \$1,600, had two 178 mm diameter cylinders with a 355 mm stroke and was rated at 12 kw.



This double ended locomotive operated on the first Government railway in Western Australia, between Geraldton and Northampton.

Australia was used on this line and the relic is on public display at Busselton. It was built in Ballarat, Victoria. In 1872 another private timber line was brought into operation between Rockingham, 29 km south of Fremantle, and Jarrahdale.

The first Government railway in the State was constructed from Geraldton (approximately 483 km north of Perth) to Northampton, a distance of 53 km. Built mainly to assist the lead and copper mining industry this railway had wrought iron rails weighing 17.4 kg/m. Many difficulties were encountered, including alteration of gauge from 914 mm to 1067 mm, and although the first sod was turned by Governor Weld on October 22, 1874, it was not until July 26, 1879, that the line was opened to traffic. This line was extended to Ajana and this section opened on January 6, 1913. Services were suspended on the Geraldton-Ajana section in April, 1957.

EASTERN RAILWAY BEGINS

The second Government line was constructed from Fremantle through Perth to Guildford — a distance of 32.19 km — and opened for traffic on March 1, 1881, forming the first section of the Eastern Railway. A 34 km connection to Chidlow's Well, via Mahogany Creek, was duly completed and opened on March 11, 1884. On June 29, 1885, the line was extended a further 79 km, taking it through Spencer's Brook to York, so provided a rail link between the agriculturally rich Avon Valley on the eastern side of the Darling Range and the coast. Completion of the line between Spencer's Brook and Northam was accomplished on October 13, 1886. The narrow

gauge Midland-Northam railway (via Swan View) remained in full service until February 13, 1966, when the new Avon Valley dual gauge (narrow and standard) railway was opened for narrow gauge operations. Trains conveying iron ore from Koolyanobbing have continued to operate as far as Wundowie on the old route.

The Avon Valley section forms part of the standard gauge railway project, details of which are supplied later in this publication. The grade of this section is 1 in 200 compared with 1 in 40 over the old route. As the new section is second only to the Metropolitan lines in respect to traffic volume, the better grades are a major factor contributing to the more profitable outcome of recent railway operations.

A feverish desire for expansion of the railway seems to have possessed the little community in the 1880s, and the following small lines found their way on to the railway map:

Belmont Branch (first section) . . .	January 1, 1885; 1.61 km
York-Beverley	August 5, 1886; 33.8 km
Spencer's Brook-Northam	October 13, 1886; 8 km
Geraldton-Walkaway	July 1, 1887; 30.5 km
Clackline-Toodyay	January 3, 1888; 22.5 km

GREAT SOUTHERN RAILWAY

The first of the proposals for building private railways under the "Land Grant System" was put forward in 1882. This provided for the construction of a line from the southern sea port of Albany northward to Beverley (391 km) in return for a grant of 4 047 000 ha of land. The proposed did not find favour until 1884 when a London syndicate accepted the offer on a basis of a grant of 3000 ha of land per kilometre of railway built. The line opened between Albany and Beverley on June 1, 1889, and was worked initially by the Western Australian Land Company. On December 1, 1896, the Government took over the line at a cost of \$2.2 million. It is still known as the Great Southern Railway, the name originally used by the company.

MIDLAND RAILWAY

During construction of the Albany-Beverley railway another agreement was signed with John Waddington for the provision of a line between Midland and Walkaway, a distance of 446 km, and connecting at each point with Government lines.

The agreement was based on that governing the construction of the Great Southern line grant of 3000 ha per kilometre of railway. Lack of capital caused a serious interruption to the construction, until the Midland Railway Company was floated in London to take over the concession. The railway finally opened for traffic on November 24, 1894. The Midland Railway Co. of W.A. Ltd. continued to own and operate this line until January, 1964, when negotiations were successfully completed for its takeover by the Government. The integration of this line into the State railway system on August 1, 1964, enabled better co-ordination of services to and from the rapidly developing north-west areas.

GOLDFIELDS RAILWAYS

In the 1890's Western Australia was in the throes of startling gold discoveries. Southern Cross, 386 km east of Perth, had been located by Risely and Toomey in 1887; Coolgardie, about 560 km east of Perth, had been discovered by Bayley and Ford in 1892, to be followed and eclipsed by Paddy Hannan's find 40 km farther east the following year, which culminated in the development of mines at Kalgoorlie and Boulder — the world famous "Golden Mile". In the northern Murchison district, eastward of Geraldton, less sensational but extremely rich finds were being reported, and thousands of people attracted to the State by the discoveries were raising an increasing cry for transportation. To meet this urgent demand, a comprehensive programme of railway construction was drawn up by the Government, catering for the new gold mining centres to the north and east, and for the expanding agricultural and timber interests in the south.

The Eastern Goldfields railway system began with the opening of the 274 km line from Northam to Southern Cross in 1894. Heavy traffic to the goldfields necessitated grades over the Darling Range and on July 1, 1896, the main eastern line was deviated from the Mahogany Creek route to run between Bellevue and Mount Helena, via the 340 m long Swan View Tunnel.

On January 1, 1897, rail communication was established with Kalgoorlie, 612 km inland. An extension to Menzies was then built and opened by the Governor on March 22, 1898.



A special train carried the Ministerial party to the opening of the railway to Kalgoorlie. The tall bewhiskered man in the centre foreground is Lord (John) Forrest.

Contractors operated the Eastern Goldfields railway until February 13, 1899, when the Government took control. An extension was opened to Laverton on February 1, 1905, a distance of just over 966 km from the port of Fremantle. Similarly the call for railway facilities for the Murchison Goldfields was met by the construction of a line from Narnagulu (near Geraldton) to Mullewa in 1894, followed by its extension to Cue in 1898. The railway was extended in 1903 to Nannine; in 1910 to Meekatharra; also from Mount Magnet to Sandstone. Between the years 1894 and 1899, over 1600 km of Government railway were added. In 1932 Wiluna — 1141 km from Perth — following re-opening of the mines, became the outpost of the northern system.

With the sensational discoveries of the goldfields occupying the public mind so intently, other phases of the economic life of the country received little notice until indications appeared that a decline in gold mining was likely. More attention was then given to the development of agricultural and pastoral industries, with such striking results that, by the end of 1909, light agricultural railways were reaching out in all directions in the eastern and south-western districts.

SOUTH-WEST RAILWAYS

On March 12, 1891, a line was opened from Bunbury through a rich agricultural district to Boyanup. The inconveniences of this isolated line were soon apparent and agitation gave rise to the opening of the 177 km of connecting line in two sections, East Perth to Pinjarra on May 2, 1893, and from Pinjarra to Picton Junction on August 22 of that year.

The settlement and production of the south-west increased and to keep pace the original Bunbury-Boyanup line was connected to Donnybrook on November 16, 1893, and to Busselton on December 26, 1895. The extension from Donnybrook to the old established agricultural town of Bridgetown was made on November 1, 1898.

By 1914 the Government had 5362 km of narrow gauge railway open for traffic and since that time more than 1600 km have been constructed. The lines were built to serve agricultural and timber interests, with the exception of an isolated railway on the south coast from Hopetoun to Ravensthorpe (55km), for mining purposes; a 183 km link between Port Hedland and Marble Bar to serve the mining and pastoral communities, 1609 km north of Perth; and one of 201 km connecting the port of Esperance with Norseman, on the Eastern Goldfields.

In the 1960s the spectacular development of Western Australia's vast mineral resources resulted in the construction of new Government and private railways throughout the State.

On July 29, 1963, a 43 km narrow gauge Government line was completed from Jarrahdale to Kwinana to haul millions of tonnes of bauxite from deposits in the Darling Range to Alcoa of Australia Ltd.'s alumina refinery at Kwinana. Originally built to carry one million tonnes of bauxite annually, this line has been extended 7 km further into Jarrahdale and is now carrying bauxite at a rate exceeding five million tonnes per annum.

The most powerful narrow gauge diesel electric locomotives (1640 kW) equipped with dynamic braking, power these trains which comprise XC

and XBC aluminium bodied wagons specially designed and constructed in Westrail's workshops at Midland. These wagons feature pneumatically operated bottom discharge doors enabling immediate unloading.



A bauxite train hauled by two N class locomotives leaves the loading tunnel at Alcoa's Jarrahdale mine site.

Western Mining Corporation's iron ore works in the Koolanooka Hills 19 km east of Morawa, began production on February 4, 1966. The ore which was railed to Geraldton for shipment to Japan, travelled over the Corporation's own 21 km spur line from Westmine (Koolanooka Hills) to Tilley, then via the 224 km Government railway to Geraldton. This operation ceased with the termination of the contract in 1974.

A new 91 km narrow gauge railway between Eneabba and Dongara was completed and officially opened on April 30, 1976. This carries sands from Eneabba to Meru for processing and export through the northern port of Geraldton.

CLOSED LINES

Owing to declining traffic in the areas they served it has been necessary from time to time to withdraw services or close some unprofitable branch lines. The first of these occurred in the 1920s with the closure of lines from Waroona to Lake Clifton, Bunbury to Bunbury Racecourse, Kalgoorlie to Kanowna and Kamballie to White Hope. In subsequent years several other branch lines have been closed. In 1957, services were suspended on 1320 km of spur lines, and in the Railways Discontinuance Act of 1960 several more lines were closed. Other closures have been the Bibra Lake-Armadale, Bellevue-Mt. Helena (via Mundaring), Bellevue-East Northam and Clackline Bolgart sections and more recently the Mullewa-Meekatharra railway.

At June 30, 1980 the W.A. Government Railway operated services on 5969 km of narrow and standard gauge railway and 277 km were opened on a seasonal basis for grain and fertiliser traffic.

STANDARD GAUGE PROJECT

A gauge of 1435 mm was adopted as the standard for Australia in 1846. However, in 1850 an Irish engineer of the Sydney Railroad and Tramway Co. recommended the adoption of 1600 mm gauge and this was made compulsory by an Act in 1852. Victoria and South Australia were advised accordingly. The Sydney Railway and Tramway Co. changed its engineer in 1852 and the newcomer, an adherent of the 1435 mm gauge persuaded the company to have the 1852 Act repealed and replaced with one making 1435 mm compulsory in N.S.W. This was accomplished without reference to Victoria and South Australia who, having placed large orders for rolling stock for the 1600 mm gauge, decided to persevere with this gauge. In South Australia 1600 mm gauge was used for the portion of the network linking Victoria and for reasons of economy 1067 mm gauge was adopted for its other lines. Queensland, Western Australia and Tasmania laid 1067 mm gauge because of limited financial resources. Although the need for unification of railway gauges in Australia was appreciated more than a century ago, it was not until Broken Hill Proprietary Co. Ltd.'s decision to spend \$10 million on mining iron ore deposits at Koolyanobbing and to build a \$100 million integrated iron and steel industry at Kwinana that the construction of a standard gauge railway was considered economically justified. The factor that attracted the steel industry was the provision of low cost transport to carry the iron ore — initially one million tonnes annually — from Koolyanobbing (58 km north-east of Southern Cross) to Kwinana, south of Perth, a distance of 499 km.

In 1960, the State Government signed an agreement with Broken Hill Proprietary Co. Ltd. for the provision of an integrated iron and steel works at Kwinana. This was contingent on the provision of a standard gauge (1435 mm) railway from Kalgoorlie to Kwinana, via Koolyanobbing and Kenwick.

On November 5, 1962, a blast in a rock face in the Avon Valley, detonated by the late Premier Sir David Brand, officially set the Standard Gauge project in motion.

The first big milestone was passed on February 15, 1966, when the dual gauge Avon Valley section between West Midland and Avon Yard, West Northam was officially opened to narrow gauge traffic by the Premier.

On November 11, 1966, the 319 km Merredin-Leighton route was opened with the despatch of the first standard gauge grain train from Merredin to North Fremantle. This represented the first commercial use of the standard gauge railway in Western Australia. All grain handled at the CBH Kwinana grain terminal — approximately two million tonnes annually — is transported in Westrail's specially designed standard gauge wagons. Powered by L class 2460 kW diesel electric locomotives, single grain trains have a trailing load of 3350 tonnes.

The next important stage in Western Australia's standard gauge history was the introduction of iron ore trains between Koolyanobbing and Kwinana in April, 1967. Trains of up to 9200 tonnes complete the 1000



Standard gauge grain train operating over the dual gauge Avon Valley section.

km round journey, including loading and unloading operations, within 24 hours.

All work was tightly co-ordinated to obtain maximum use of the line and the construction of the 200 km section of railway between Koolyanobbing and Kalgoorlie was completed some months ahead of time.

A colourful ceremony was held at Kalgoorlie on Saturday, August 3, 1968, when the last length of rail was laid. The Commonwealth Minister for Shipping and Transport, Hon. Ian M. Sinclair, M.P., drove one "gold" dog spike and the late Premier of Western Australia, Sir David Brand, M.L.A., drove the last "gold" spike to officially link the two standard gauge railways. The Premier then operated the first locomotive over the link.

On November 2, 1968, the first freight train left Port Pirie on the interstate service "through" to Forrestfield and Leighton on the west coast of Australia. For the first time in Australia's history, there was no need to transfer freight between the gauges at Parkeston. Since this date, through freight trains have operated on a twice daily schedule in each direction. One train, a fast freighter, covers the 2437 km journey from Forrestfield to Port Pirie in under two days. Thus began a new era in transcontinental rail transportation.

Among the many ancillary works carried out in conjunction with the standard gauge project was an extensive railway complex in the Forrestfield-Kewdale area which has become the very heart of the entire system.

The Forrestfield project covers an area of 247 ha and embraces composite gauge marshalling yards, including an automatic hump retarder narrow gauge yard, and locomotive, wagon and carriage depots. The marshalling yard includes seven standard and seven narrow gauge arrival



On Saturday, August 3, 1968, the then Premier of Western Australia, the late Sir David Brand, M.L.A., drove the last "gold" dog spike to officially link the standard gauge railway at Kalgoorlie. He is accompanied by the then Minister for Railways, Hon. R. J. O'Connor, M.L.A.

roads and eight standard and 32 narrow gauge classification roads. The locomotive depot replaces East Perth as the major metropolitan depot and provides scheduled maintenance and some heavy repair facilities for up to 200 narrow and standard gauge diesel locomotives.

The Kewdale Freight Terminal occupies 120 ha and is the principal centre for the receipt and delivery of both narrow and standard gauge traffic. Conveniently located 10 km south-east of Perth, it provides vastly improved services to railway clients.

Several narrow gauge sidings were brought into operation at Kewdale early in 1967. In November, 1968, some roads at Forrestfield and standard gauge facilities at Kewdale were commissioned. Since October, 1970, all standard gauge interstate and intrastate traffic and the majority of narrow gauge traffic from Perth and suburban stations has been handled at the Kewdale Freight Terminal.

On Sunday, June 15, 1969, the first standard gauge passenger train, with stainless steel, air-conditioned carriages of world standard, arrived at the newly constructed Perth Terminal from Port Pirie on the direct through service. This train departed from the Terminal for Port Pirie the same evening. This was the first occasion that passengers had travelled across Australia without changing trains at Kalgoorlie.

(The narrow gauge "Westland" interstate train left Perth for the last time on Saturday, June 14, 1969.)

Standardisation of railway systems in Australia to link Kwinana and Fremantle with Sydney via Port Pirie and Broken Hill became a reality on November 29, 1969, when the Prime Minister of Australia officially linked the new line at Broken Hill. Sydney is already linked by standard gauge to Melbourne and Brisbane, and a link to Adelaide has been approved.

The first standard gauge freight train ran on the direct "through" service between Sydney and Kewdale on January 15, 1970.

Two streamlined stainless steel air-conditioned passenger trains, as modern as any in the world, began operating on the Sydney-Perth service on March 1, 1970. Named "The Indian-Pacific", these trains feature first and economy class sleeping cars, lounge bar, cafeteria club and dining cars. They cover the 3961 km journey in 65 hours.

UPGRADING

The first phase in the five year 500 km rehabilitation project of the standard gauge line between Kwinana and Koolyanobbing started in 1977 with signing of a \$17.5 million contract for manufacture of 940000 concrete sleepers, the largest single contract of its kind ever signed in Australia at the time.

The standard and dual gauge pre-stressed concrete sleepers are manufactured by John Holland Constructions Pty. Ltd. at a specially-built factory at Meckering.

The railway will be the heaviest-duty Government railway in Australia using 60 kg/m rail rolled in 27.4 metre lengths by BHP Ltd. at Whyalla, South Australia.

Roberts Constructions (Pacific) Pty. Ltd. who were awarded the contract for renewal of the main track, is using a "P 811" machine imported from Italy. This machine simultaneously removes old rails and sleepers, reshapes the ballast and places new sleepers and rails in position in a continuous operation.

A flashbutt welding complex, claimed to be the largest of its type in the world, was opened at Midland on November 22, 1979. It was designed expressly for handling 60 kg/m rail required during the Kwinana/Koolyanobbing railway rehabilitation project.

At the depot 27.4 metre lengths of rail are butt welded into 274 metre lengths and transported to the re-railing site aboard special wagons, where they are thermit-welded sometimes over sections as long as eight kilometres.



The giant P 811 track renewal machine in operation on the Kwinana-Koolyanobbing standard gauge line.



Unloading 60 Kg/m rail by gantry at Midland Flashbutt Welding Depot.

WEST KALGOORLIE-ESPERANCE STANDARDISATION

The discovery and development of rich nickel deposits in the Kalgoorlie region, particularly at Kambalda, 50 km south of Kalgoorlie and the export of nickel concentrates through the southern seaport of Esperance as well as salt from Lake Lefroy resulted in a big increase in the volume of traffic carried on the Coolgardie-Esperance railway. To cater for this traffic a new 15 km spur line was constructed from Lake Lefroy to Widgiemooltha and the 290 km Widgiemooltha-Esperance section of railway was substantially upgraded.

Following standardisation of the Eastern Railway and the establishment of nickel refineries at Kwinana and South Kalgoorlie, construction of a new 90 km standard gauge railway from West Kalgoorlie to Lefroy and the conversion of the 306 km Lefroy-Esperance section to standard gauge was approved in November, 1971, and brought into operation on September 16, 1974.

Further discoveries of nickel deposits north of Kalgoorlie resulted in the conversion of the 272 km Kalgoorlie-Leonora railway to standard gauge and this was also brought into operation on September 16, 1974. The narrow gauge sections between Kalgoorlie and Boulder, and Kalgoorlie and Widgiemooltha were closed from this date.

With increased interest in nickel mining, and possibly greater development in the future, the standard gauge railway between Kalgoorlie and Leonora is being upgraded. The line has been re-sleepered and ballasted and work commenced in October 1980 on re-railan with 47 kg/m rail recovered from the line between Kwinana and Koolyanobbing.



"Indian Pacific"; the luxurious interstate passenger train that travels between Perth Terminal and Sydney.



An iron ore train leaves the mine site at Koolyanobbing for the journey to Kwinana.



A delicious meal is served aboard the Prospector on the journey between Perth Terminal and Kalgoorlie.

PASSENGER TRAINS

Great improvements in passenger travelling-comfort have been made in recent years.

On November 29, 1971, "The Prospector" standard gauge stainless steel, air-conditioned railcar service began operating on the 655 km Perth Terminal-Kalgoorlie route and replaced "The Kalgoorlie" overnight sleeping berth train which had been operating since 1897. (The last of "The Kalgoorlie" trains left City Station and Kalgoorlie on November 28, 1971).

The "Prospector" is the fastest train in Australia and completes the journey in under eight hours. It features reclining chairs, carpets, meal and liquor services.

"Australind" express operates between Perth and Bunbury providing a fast diesel-powered service in each direction daily, Sundays excepted. This daylight train has buffet-lounge facilities. "Albany Progress" and "The Midlander" overnight passenger trains operated on a regular basis until recently. "The Midlander" was withdrawn on June 31, 1975 and "The Albany Progress" on December 1, 1978. These services have been replaced by modern air-conditioned road coaches.

The "Westland" Express which previously operated the Perth-Kalgoorlie section of the Trans Australian Railway Service commenced running on June 4, 1938.

Since the first line was opened, more than 1000 million passengers have been carried on the system, and not one paying passenger has suffered fatal injury as a result of accident.

FREIGHT TRAFFIC

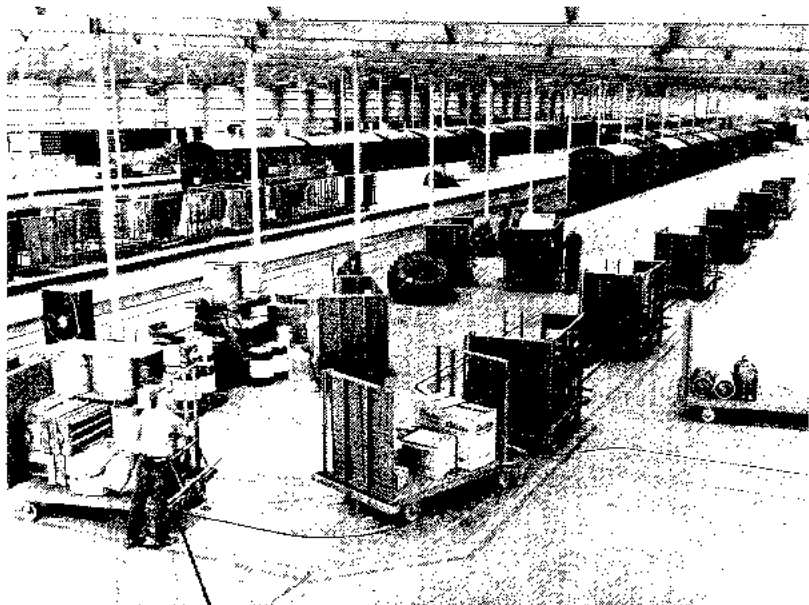
With more than 100 years' experience, Westrail is a specialist in the field of transport and operates the State's major transportation and freight handling facilities.

Powerful diesel locomotives and specially designed rolling stock have been commissioned to provide rapid and economical movements of goods anywhere throughout the system.

To facilitate and expedite loading and delivery of freight, major depots are equipped with modern goods handling machinery including gantry cranes, fork lifts, pallet lifters and mobile cranes of various capacities.

To serve the ever growing demands for transport of both general and specialised traffic, constant research is being undertaken by Westrail to ensure that the fleet of freight wagons is maintained at a very high standard. Specially designed rolling stock is provided to facilitate the transport of commodities such as bulk cement, grain, bauxite and iron ore, timber, motor vehicles and container traffic.

Almost 13 000 freight wagons are in service and each year an increase in "paying goods" tonnages is accomplished.



The underfloor truck conveyor system in the outwards shed, Kewdale Freight Terminal.

LOCOMOTIVES

Before the advent of diesel locomotives in 1954 this system operated 430 steam locomotives and hauled 3.5 million tonnes of paying traffic. These steam locomotives were specially designed to use coal mined locally at Collie. The most powerful of these locomotives were the V class, which weighed 136 tonnes and had a tractive effort of 150 Kn

At June 30, 1980, 151 diesel locomotives were in service and these hauled 21.4 million tonnes of paying traffic.

Dieselisation of the system began on November 28, 1954, with the commissioning of the X class 824 kW diesel electric locomotives, 48 of which were acquired. Subsequent acquisitions have included narrow and standard gauge locomotives ranging from Y class 306 kW shunters to L class 2460 kW main line locomotives which are as powerful as any operated by government railways in Australia.

Ten diesel locomotives were acquired with the takeover of the Midland Railway in 1964.

Dieselisation of the entire service was completed in 1972. The standard gauge railway is operated entirely by diesel locomotives, including 23 L class which weigh 137 tonnes and haul 3350 tonnes at 80 km/h. Three of these locomotives coupled together and operated by one crew, have hauled iron ore trains of 10 000 tonnes.

At June 30, 1980 Westrail's narrow and standard gauge rolling stock included 151 main line locomotives, 107 passenger vehicles, 213 brake vans and 9776 goods vehicles equal to 11 106 four-wheeled narrow gauge wagons and 1248 standard gauge wagons.

SUBURBAN

From November 28, 1954, the metropolitan passenger service was modernised with 18 ADG diesel mechanical railcars, providing a 20-minute service on most sections during off peak hours, with additional trains in peak periods. Several new stopping places were established and a chit ticket system was inaugurated to facilitate fare collection.

The public was quick to appreciate the advantages of this service and as a result 14 new suburban passenger carriages were placed in service in subsequent years. These cars were so designed that they can be used in suburban railcar sets or as part of diesel-hauled trains. In 1959-60 10 new ADX railcars and 10 ADA class trailer cars equipped with driving cabs were constructed in the Midland Workshops, the ADX being of an improved design to the ADG railcars with more powerful motors making each car capable of hauling a trailer car. Their use in conjunction with ADG and ADX class cars enabled railcar/trailer sets to operate without the necessity to reverse the position of the trailer at terminal stations.

The suburban service was further modernised in 1967-68 with the introduction of 10 ADK stainless steel 284 kW diesel railcars and 10 Westrail-constructed ADB matching driver-trailer cars.



Commuters experience easy transfer from bus service to suburban rail at the Kelmscott Transfer Station.



Westrail's Mercedes road coaches provide a regular service to and from country centres.

Since October 5, 1968, the suburban service has been operated entirely by diesel motive power.

At June 30, 1980 the suburban fleet comprised 18 ADG, 4 ADH, 10 ADX, 20 ADA, 10 ADK and 10 ADB units. A further 10 stainless steel railcars and trailers are on order.

The first diesel electric railcars in Australia, the "Governor" class, were introduced in 1937 and operated fast daylight country services.

In the post-war rehabilitation scheme, six three-unit diesel electric trains comprising a combined power and baggage car, with two 64-seat one-class trailer cars were operated on fast daylight runs serving country districts. Known as the "Wildflower" class, these cars were classified ADF and named after Western Australian wildflowers: Boronia, Crowea, Hovea, Leschenaultia, Grevillea and Banksia.

Two ADF and four ADU units were specially refurbished in May, 1964, to operate as "The Shopper" and "Bunbury Belle" trains on the Perth-Bunbury route. These were withdrawn from service on August 1 1975 and replaced with coach services.

RAILWAY ROAD SERVICES

Railway Road Services commenced in November, 1941, with one bus, powered by producer gas. This operated from Perth to Kojonup, via Boddington and Williams — a distance of 256 km. In December, 1946, this



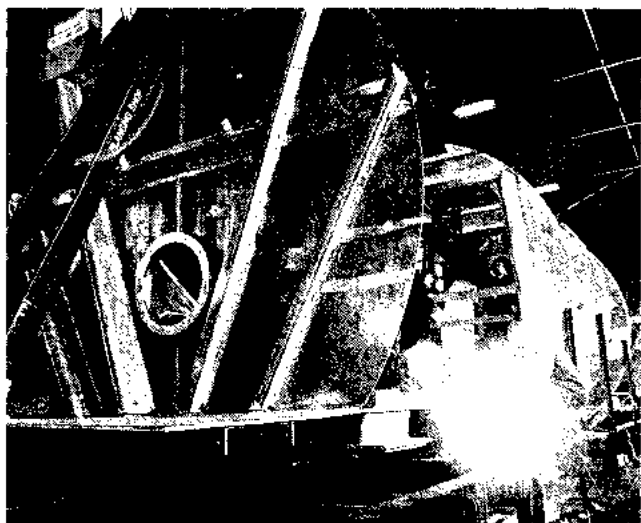
Westrails road trucks co-ordinating freight movements with rail services.

route was extended to Cranbrook (323 km) then in September, 1949, to Albany (414 km) and Walpole (126 km from Albany) via "The Valley of the Giants". As more buses became available the services were extended throughout the south-west district.

Road services have developed rapidly and at present a fleet of 45 modern buses operate over 7006 route kilometres throughout the State. The longest run is between Perth and Meekatharra, a distance of 782 km. In recent years airconditioned motor coaches have been commissioned to replace outdated vehicles.

Passenger-freighter buses were first introduced in November, 1949. Seven new units were purchased to provide passenger and goods and mail services to country districts.

Developments have included introduction of motor trucks in co-ordination with some rail services, mainly to handle perishable and small consignments between wayside stations and goods depots where they are transhipped to and from rail wagons. This method enables much faster handling of these consignments. Several extensions of the motor truck services took place and with the withdrawal of rail operations from some branch lines. Westrail has been able to retain its business in many of those areas by co-ordinating road and rail services for this purpose. Mobile rail and road containers enable goods to be transported initially by rail



Wagons of international standard are constructed at Westrail's Midland workshop.

then towed by railway road vehicles to localities without rail access.

The railway road services now operates more than 220 light road motor vehicles.

WORKSHOPS

Westrail's Workshops at Midland, 16 km east of Perth, began operations in 1904 and occupy a total of 68 ha, of which 11 ha are under cover. The number of staff employed averages 2300.

Activities at the workshop cater for all phases of manufacturing and repair requirements for railway needs including the construction and maintenance of rolling stock, the manufacture of points and crossings and many other railway components. Rolling stock construction has included railcars, coaches, wagons, and steam locomotives. Recent achievements include the design and manufacture of modern stainless steel railcar trailers as well as the majority of bulk commodity wagons, covered vans, and aluminium bodied grain hopper wagons, the largest in the Southern Hemisphere.

Machinery of all descriptions ranging from a 1000 kN press to delicate instrument repair equipment is provided. The progressive changeover from steam to diesel traction has outmoded a portion of the heavy equipment and replacement by machinery allied to the repair of diesel engines has taken place.

The annual intake of apprentices exceeds 140 and approximately 550 are continuously being trained. Many of the State's finest artisans have had their basic training in the Midland Workshops and Westrail is proud of the general high regard in the community for the skill of tradesmen trained at Midland.

SAFEWORKING

The safeworking system generally is based on the British Board of Trade Railway Regulations. Various methods are used according to density of traffic, and to single or double track operation. The methods include Three Position Block; Centralised Traffic Control and Remote Control with three aspect automatic colour light signals, "electric staff" and "staff and ticket" (on single lines). Three aspect automatic colour light signalling is in operation on double line working between Fremantle-Perth-Midland and East Perth to Armadale. A system of "train control" has been adopted to ensure efficient and on time services. Controllers, located at Westrail Centre and Midland, control all train movements over almost the entire network.

A similar control system is in use on the Brunswick-Narrogin line, "Centralised Traffic Control" systems of train working have been installed on the south-western main line between Armadale and Coolup, between Kwinana and Mundijong Junction, from Forrestfield to Kwinana and Robb Jetty and between Bellevue and Avon Yard over the dual gauge Avon Valley section and on the standard gauge railway as far as Koolyanobbing.

Automatic colour light signalling has been installed on the full length of the standard gauge line, with area control equipment at the main centres.



Night shunting operations over the automatic hump marshalling yard at Forrestfield.



The Hump Controller checking wagon movements at Forrestfield Marshalling Yard.

GENERAL

Westrail employs a large number of professional men, technicians and unskilled labour, as well as providing work for thousands more in the supply of materials in every shape and form, and upon them to a very great extent has depended the development of the State.

The railway system is divided into six "Districts", namely Metropolitan, Central, Eastern, Southern, South-Western and Northern. Each is administered by District Officers of the operating branches of the services. At June 30, 1980, there were 9727 employees on Westrail's payroll.

As the railways have grown with the years, naturally the amount of work performed, together with earnings, and expenses, has increased considerably, particularly in recent years.

In 1879, the heaviest steam locomotives weighed 30 tonnes; four-wheeled wagons held five tonnes and carriages were small four-wheeled vehicles with three passenger compartments, the centre one first class and the others second class.

In 1972, the heaviest steam locomotive, V class, weighed 137 tonnes ready for the road. The L class diesel electric locomotive weighs 137 tonnes. The highest capacity wagons for narrow gauge traffic carry loads of 64 tonnes, but a special 16-wheeled wagon (QX) occasionally used for extraordinary loads, will carry 93 tonnes. Standard gauge wheat carry 76 tonnes and iron ore wagons have a capacity of 73 tonnes.



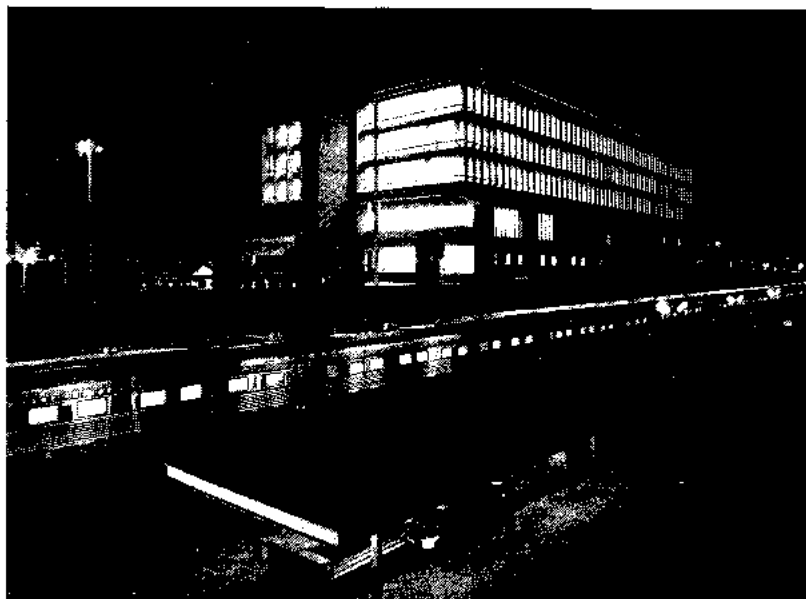
Perth Central Station (now City Station) about the turn of the century. Note the railway delivery vans on the left.

Available records show that in 1879 the total number of passengers carried was 1037, goods and livestock 1678 tonnes, earnings \$3216, working expenses \$4670, but there are no details available of train-miles until 1881, when the records show 108 900 km for that year. Gradually the traffic progressed to the year 1894 and then rapidly increased with the the discovery of gold.

In the last 10 years, expansion of Western Australia's agricultural pursuits and the spectacular development of its mineral resources has seen substantial increase in rail traffic. New records for tonnage of paying goods and livestock hauled have been created each year and in 1980 a record 21 388 402 tonnes were carried and a record 4 730 670 994 tonne kilometres achieved.

Specially equipped cars and vans employed by Westrail include track test, locomotive instruction, weighbridge testing, breakdown and oxy-welding and a special van fitted with a strong safe for the conveyance of smelted gold from the mines.

The Western Australian Government Railways played an important part in Australian operations during World War II, by the conveyance of men, arms and materials. Large quantities of material for our Armed Forces were produced at the Workshops, including nearly 1.5 million 25-pounder shells, much machinery for the Navy and many precision gauges for cartridge manufacture, valued in all at close to \$4 million. Many railway-men joined the Armed Forces. The largest number away at any one period was 1500 or about one-sixth of the total staff at that time, in 1943.



The night scene of the Westrail Centre with the interstate train platformed at Perth Terminal.

The Railway Stores are situated at Midland and stores on hand at any time have an approximate value of \$10 million, with annual purchases of \$30 million.

Until June 30, 1961, the Department also operated its own sawmills at Banksiadale, 7 km from Dwellingup, on the Hotham Valley branch line.

The Chief Civil Engineer's offices are situated at Westrail Centre with electrical, signalling, interlocking and general workshops, located at Forrestfield.

There are approximately 1000 bridges throughout the system; the longest being the "Bunbury Bridge" (405.84 m) crossing the Swan River near East Perth.

The foundation stone for Perth Central Station was laid on May 10, 1880. Platforms total eight including two docks and one island platform, the longest being 365.2 m.

Under the narrow gauge rails are more than 10 million Western Australian hardwood sleepers - jarrah, wandoo, etc. These are 2150 mm long by 235 mm wide and 120 mm thick; each weighs approximately 51 kg and has an average normal life of 25 years. Originally rails were up to 12 m in length and varied in weight from 22.4 kg/m to 40 kg/m.

WESTRAIL CENTRE

With the commissioning of Perth Terminal for interstate passenger services on June 15, 1969, Perth Railway Station was renamed City and East Perth station was renamed Claisebrook. A platform 624.8 m in length,

has been constructed at Perth Terminal and is the longest on the system.

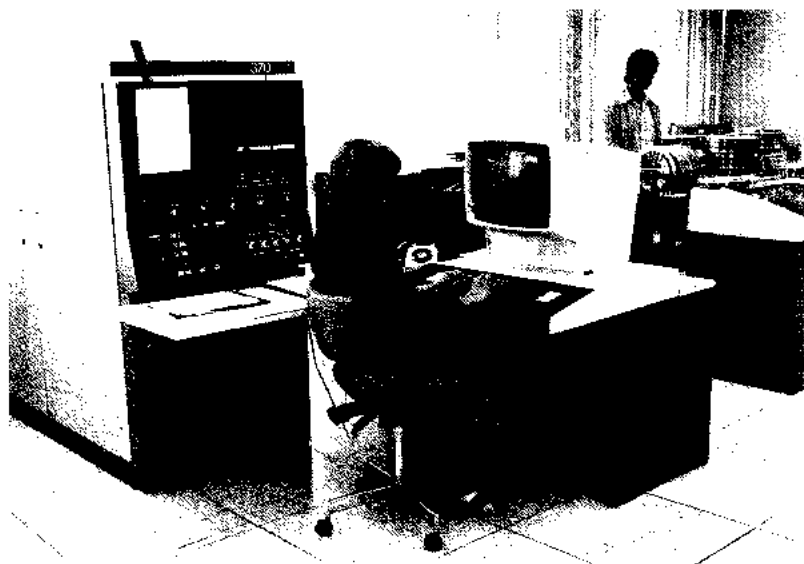
The Westrail Centre, officially opened on November 12, 1976, is a modern passenger terminal catering for interstate and intrastate train and bus passengers and a combined administration headquarters for 800 Westrail personnel with associated support facilities.

This has provided for greater efficiency and economies in the administration and operation of the entire system.

Passenger services on the main concourse include booking lounges and offices, luggage and enquiry counters and a shop. The stylish Westrail Tavern on the first floor, incorporates an air-conditioned fully licensed restaurant and bar and is available to the general public.

COMMUNICATIONS

Westrail's administration and operation is dependant on its own extensive communication network, the backbone of which is some 29 000 km of wire on 84 000 poles. On important and high density routes such as Perth-Northam, Pinjarra-Bunbury and Brunswick-Collie, the aerial wires are being supplanted by microwave and/or cable. On low density routes, stations still rely on the magneto party line telephone for general business and train working but these are gradually upgraded to exclusive automatic telephones and carrier channels to permit segregation of all calls. The aerial line is retained as a bearer for the carrier channels and for use by "on track" and other personnel who must communicate with the train controller. The automatic telephone network now comprises 2000 telephones at 10 country and five metropolitan exchanges. Carrier telephone systems link the various exchanges to permit direct dialing through the system.



Modern Computers are an integral part of Westrail's operation.

exchanges to permit direct dialing through the system.

The early hand morse code telegraph system has been replaced by an automatically switched teleprinter network with centralised facilities for multiple address transmissions. Communications between computers and their peripherals takes place over five data links each of which operates at 4800 bits/second as part of the 'on-line' Materials Supply System operated by the Supply Manager.

Radio in Westrail began with the use of Citizen Band type units on the Jarrahdale bauxite line in the early 60's. Later, VHF mobiles and bases were installed for the iron ore haulage between Westmine and Geraldton. In the late 60's, the K class locomotives were provided with mobiles and in the early 70's the Kalgoorlie-Koolyanobbing wayside radio bases permitted communication between trains on that route and the controller at Merredin. High frequency (UHF) sets were used for the first time in the Forrestfield Marshalling Yard installation. The most recent projects are the installation of a microwave link between Midland and Northam and the extension of the Kalgoorlie-Koolyanobbing system to give full coverage through to Kwinana.

**Save Energy— Railways carry
75-80% of traffic and use only
2.5% of the nation's fuel**

